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ABSTRACT

During the decade of the 1980s, rapid changes in the nature of medical practice and in patterns of health care delivery confronted medical educators with many challenges. At the Medical College of Wisconsin these challenges led to the design and implementation of the 2-year longitudinal experience called the Profession of Medicine Program (POMP) which is the subject of this paper. Based on the student development theories of William Perry and Arthur Chickering, POMP provides first and second year medical students a series of short didactic courses and small groups preceptor meetings designed to facilitate the development of the students' professional identity. The program was evaluated using two methods: a student evaluation and a semi-structured generation instrument, the Measure of Intellectual Development (MID), designed to measure a student's view of the role of uncertainty in making knowledged-based decisions. Results of the MID generally demonstrated a significant developmental gain on the part of POMP participants, while their score distributors showed significant differences with those of a control group at equivalent times in their medical educations. Approximately 70% of fourth year students who were also POMP participants achieved a score of 3 to 4 on a scale of 1 to 5. The students themselves reported that the program challenged them to think about the issues identified as program objectives. (12 references and 4 tables.) (JB)

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Fostering the Professional Development of Medical Students

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ABSTRACT

Medical education in the 1990's faces many challenges as it prepares graduates to practice in a rapidly changing environment. Recognizing that biomedical knowledge and skills alone are not sufficient preparation for medical practice, the Medical College of Wisconsin has implemented a two-year curriculum explicitly designed to facilitate medical students' development of a professional identity, with an emphasis on the ability to make reasoned judgments in the face of uncertainty. Grounded in student development theory, the program is structured to challenge medical students' conceptions of the physicians' roles, responsibilities, values and competencies through a series of short didactic courses and small group preceptor meetings. Results of a three-year study designed to evaluate the impact of POMP on students' assumptions about the nature of uncertainty in medicine indicate that POMP students score significantly higher on the Measure of Intellectual Development than a non-equivalent control group of medical students.

Medical educators faced many challenges in the 1980's, a decade during which the validity and effectiveness of the traditional medical school curriculum were questioned in light of rapid changes in the nature of medical practice and in patterns of health care delivery. At the Medical College of Wisconsin, these challenges led to the design and implementation of a two-year longitudinal educational experience entitled the Profession of Medicine Program (POMP). Recognizing that biomedical knowledge and procedural skills alone are not sufficient for the competent practice of medicine, POMP was designed to facilitate the development of medical students' professional identity. This paper will present an overview of this innovative educational program in terms of its underlying theoretical framework, the curriculum structure and educational methods derived from this framework, and the results of an evaluation study designed to assess the impact of this program on medical student development.

Methods

Development of Course Goals

In 1984, the Association of American Medical Colleges (AAMC) issued the "Report of the Panel of the General Professional Education of the Physician" (GPEP).[1] The GPEP Report recommended significant changes in undergraduate medical education programs. About the same time, the Liaison Committee on Medical Education (LCME) was working on new guidelines for accreditation standards.[2] At the Medical College of Wisconsin (MCW), a faculty task force proposed several curriculum changes, consistent with GPEP

and LCME recommendations, that would foster the development of a professional identity, with an emphasis on problem-solving and independent learning in the changing health care environment. The complexity of identity development and medical problem solving, as educational outcomes, led to a search for a theoretical framework which would help structure both the program design and the measurement of the program's impact.

Theoretical Framework

The conceptual framework for POMP is based on college student development theories which describe the personal, professional, and intellectual issues that influence the development of one's adult identity. Student development theory has been used as a framework in higher education both for designing instruction and as a construct for evaluating the impact of higher education on students.[3,4] Two major developmental theories underlie the development and evaluation of POMP. Arthur Chickering's[5] psychosocial theory of college student development describes the issues and decisions which confront individuals as they develop a sense of purpose and identity. More specifically, Chickering posits a series of vectors that comprise components of identity development. Those vectors include establishing a sense of competency (i.e., intellectual, procedural, and interpersonal), developing a sense of professional responsibility, and establishing a sense of professional and personal integrity. These vectors were felt to be in close accord with the intended outcomes of medical education: physicians who can integrate science and art into the practice of medicine.

The second major developmental theory which underlies POMP is William Perry's theory of cognitive development.[6] Cognitive development theories describe the manner in which thought processes develop and relate those processes to the design of instruction.[7] Perry's scheme articulates the evolution of students' assumptions regarding the nature of knowledge, moving from a position where knowledge is absolute (right/wrong), through a position of uncertainty where one answer is as valid as another, to a position where the value of knowledge is judged based upon contextual factors. More specifically, Perry argues that the epistemological development of young adults progresses along a series of six positions. Those whose development is at the lower end of the Perry scale (positions one and two) have a dualistic view of knowledge; they tend to believe that absolute truth exists. Individuals in positions three and four view knowledge as multiplistic in nature, and they are able to comprehend that more than one possible answer exists. Individuals in this stage of development also accept that truth is unknown in many areas. In the relativistic positions of development (positions five and six), individuals begin to consider knowledge as relative; the validity of answers is judged within a context which recognizes that all knowledge is based on inference and assumptions about what is truth.

Physicians must be able to make reasoned judgments in the face of ambiguous and perhaps conflicting evidence. Therefore, during medical school medical students must learn to become comfortable in a milieu of uncertainty. Students must develop a sense of competence, responsibility, and integrity in an educational environment where "the right

answer" is often not available. Diagnostic decisions (e.g. sensitivity versus specificity of lab tests); treatment decisions (e.g. chemotherapy versus radiation therapy versus surgery); and ethical decisions (e.g. patient autonomy versus beneficence) all represent difficult choices. Perry's theory addresses how students think about such issues in the context of uncertainty and describes the ways in which students' thinking changes over time. In combination, Chickering's theory outlines the content domains needed to achieve a professional identity (i.e. integrity, responsibility, and competence), and Perry's theory provides a description of the changes which must occur in how students think about these identity issues. Based on these two theoretical perspectives, the following objectives were identified to foster the development of students' professional identity:

1. to establish a sense of competence (intellectual, procedural and interpersonal);
2. to establish a sense of professional responsibility;
3. to establish a sense of professional and personal integrity;
4. to make decisions in the context of medical, ethical, social, economic, and political uncertainty.

Program Description

The Profession of Medicine Program (POMP) is a required component of the first and second year curriculum at the Medical College of Wisconsin. Designed as a

longitudinal, two-year program, POMP provides a structured set of educational experiences that assist students in beginning the process of establishing a professional identity based on Chickering's vectors of development and Perry's scheme of cognitive development. The sequence of learning in POMP relates to what students are learning in other courses, and the issues addressed move from the individual to the more general. For example, students first consider the nature of a profession and the responsibilities of professionals, focusing on how they -- as individual medical students -- fit into the medical profession. Later, students consider how the medical profession fits within a broader social context, and how social, economic and political forces impact upon the profession. A course in death and dying coincides with their study of pathology, when students are -- often for the first time -- confronting issues of morbidity and mortality. Two different but complementary educational methods are used throughout the program: (1) a series of short, didactic courses and (2) ongoing small group meetings led by a senior faculty member.

Each of the short courses challenges students to think about at least one of the elements of a professional identity. For example, beginning first year students enroll in a five-week course entitled "The Medical School Experience" that focuses on the development of two identity vectors: (1) interpersonal competence as students begin to establish professional relationships with colleagues, patients, and faculty; and (2) professional responsibility as they observe the roles and obligations of senior medical

students and discuss the needs for life-long learning. The second year course on Death and Dying addresses all three of Chickering's identity vectors (competence, professional responsibility, and integrity) as well as comfort with uncertainty. During the course students explore cultural, social and religious beliefs and attitudes toward death; confront their own attitudes; address the issues of patient death as a physician's personal failure; and interview a patient regarding a recent loss. A course in Patient-Oriented Skills (interviewing and physical diagnosis) fosters a sense of competence by helping students acquire those skills necessary to interact effectively with patients. Table I provides a brief description of each of the short courses and indicates how each meets the program objectives derived from the Chickering and Perry theories.

Student performance in each of the didactic courses is assessed by a combination of methods, including written examinations and projects (e.g. an interview with a patient regarding loss; an oral presentation on the roles of the physician and medical uncertainty in the diagnosis and treatment of selected diseases). All grades become a part of the student's official transcript.

The second major educational method employed in POMP is the small group sessions. Groups of eight to ten students meet with a senior physician faculty member approximately 25 times during the two-year program. During these sessions, students

discuss, reflect and expand on the issues presented in the short courses. Preceptors act as small group facilitators, often using their own clinical experiences to stimulate discussion. A Preceptor Guide provides information regarding major themes to be addressed and suggests methods to prompt discussion of those themes. However, a great deal of latitude is given to the individual preceptors, to encourage them to draw upon their own experiences. The small group discussions provide another venue for students to establish professional relationships with their colleagues and to learn to work effectively as a team member. Based on the principles of developmental instruction,[8] the small groups are structured to challenge students to explore their assumptions about their own roles, responsibilities and values, as physicians in training, while concurrently providing a supportive environment in which to test out new ideas and/or ways of thinking. Students are required to attend the preceptor sessions, and preceptors are encouraged to provide feedback to students in their groups about their participation, but formal evaluation of student performance in the small groups is not requested.

Results

Program Impact on Students: Research Design and Study

Evaluation of POMP represents a complicated task for several reasons, given the nature of the course goals. Unlike the more common, limited goals that can be assessed immediately upon completion of a course of study, the successful attainment of the POMP goals will be reflected in long-term changes in attitudes and behaviors that comprise a professional identity.

Two sources of information used to evaluate program impact are reported in this paper: (1) student evaluation of the program and (2) assessment of students' understanding of the nature of medical knowledge. For the first component of program evaluation, students are asked two to three times a year to evaluate their didactic courses, their small group sessions, and the overall effectiveness of the program. Program effectiveness is assessed by asking students to respond to four items related to the program objectives. Responses from the most recent set of evaluations completed by each class are presented in Table II. In general, between two-thirds and three-fourths of the students believe that POMP has challenged them to think about each of the major themes of the course: the changing roles of the physician, uncertainty in medicine, professional responsibility, and integrity.

For the second evaluation component, a research design was developed to evaluate the impact of POMP on the development of one element of a professional identity: understanding the nature of medical knowledge, as reflected in the ability to make reasoned judgments in uncertainty.

Assessment Instrument

Perry's theory postulates an invariant series of changes in the ways individuals view the nature of knowledge and the role of uncertainty in making knowledge-based decisions.

A semi-structured generation instrument entitled "The Measure of Intellectual Development" (MID)[9] was designed specifically to determine an individual's position along Perry's stages of cognitive development. The MID is composed of a series of open-ended essay questions that evaluate the respondent's views on the nature of knowledge and uncertainty. Each essay was scored by trained raters certified by The Center for the Study of Intellectual Development located in Olympia, Washington.

Design and Sample

The study used a pre-test/post-test, nonequivalent control group design.[10] While the control group was nonequivalent, there were no other identifiable factors (e.g. age, educational background, undergraduate grade point average, MCAT scores, or major field of study) that might account for differences between control and experimental groups. The pre-test MID was administered to all first, second, third and fourth year medical students in the fall of 1988. Randomly selected sub-samples of 50 MIDS from second, third and fourth year students were scored and designated as the control groups. The first medical school class to experience the POMP curriculum was designated as the experimental group and completed the MID in the fall of 1988 (before POMP commenced), in the fall of 1989 (after completing one year of POMP) and in the fall of 1990 (after completing both years).

Analysis

The MID ratings for this study were reported as position scores along a continuum of developmental stages from 1 to 5. Low scores (1-2) indicate that the respondent's thinking is "dualistic" in nature, viewing uncertainty as unacceptable -- an answer is either right or it is wrong. High scores reflect advanced epistemological development, indicating that the respondent accepts uncertainty and makes decisions based on context. Transitional scores (e.g. 2/3 or 3/4) indicate partial progression to a higher stage. Given the ordinal nature of the data, the Kalmogorov-Smirnov (KS) test was used to analyze the distributions of developmental scores among the groups.[11]

Results of the K-S test comparing control groups indicated that the distribution of MID scores did not significantly differ between first, second, or third year students. Scores from the fourth year students, however, were significantly different from each of the other classes ($p < .01$) with fourth year students exhibiting substantially higher developmental position scores. The analysis also revealed that the distribution of developmental scores of the experimental group prior to experiencing the POMP sequence were not different from the distribution of scores of the control groups (Figure 1).

At the conclusion of the two-year program, the experimental group showed a significant developmental gain. Comparisons displayed a significant ($p < .01$) difference in the pre-treatment and post-treatment scores of the program participants. Comparisons also

revealed significant differences ($p < .01$) between the treatment group and the control group, indicating a significant developmental gain that is attributable to the POMP program (Figure 2).

Discussion and Conclusions

The Profession of Medicine Program was designed to facilitate professional development in medical students. Grounded in the developmental theories of Arthur Chickering and William Perry, POMP is structured to challenge students' conceptions of the roles, responsibilities, values, and competencies needed to practice medicine successfully.

Students report that POMP has challenged them to think about the issues identified as program objectives. The ability of students to make reasoned judgments in uncertainty has been evaluated using a non-equivalent control group design. Results of the analyses revealed no differences among the control groups from the first, second, or third years of medical school. However, the scores of the control group of fourth year medical students were significantly different from any of the other student groups. Fourth year students showed a bifurcated distribution of scores, with the majority (approximately 70%) having achieved stage 3/4 of development and the remainder falling into stage 2/3. This phenomenon, not uncommon in human development, has been described by several theorists.[12] When individuals are confronted with a crisis or significant challenge in life

(such as the expectations and demands of clinical rotations), they are often able to accommodate or adapt to the challenge. By doing so a developmental "boost" occurs, resulting in progress to a higher stage. However, if the challenge is overwhelming, individuals may actually regress to a previous stage. The fact that a large proportion of the senior medical students had advanced to a higher Perry position, while a small number remained in -- or perhaps fell back into -- a lower stage, may be attributable to this developmental circumstance. Further research is underway to determine whether other student groups, including students who have completed POMP, display this pattern.

The score distributions of the POMP group with the control group at equivalent times in their medical education revealed significant differences. A greater proportion of the students in the POMP group had progressed into the middle, multiplistic range of Perry's positions than the control group. Likewise, fewer students in the POMP group remained in the lower dualistic positions. Since all other aspects of these students' medical education were essentially identical, and since there were no obvious demographic differences between the groups, the developmental difference can be attributed to the POMP program.

Further research is needed to determine whether these developmental changes are stable and whether these students will continue to experience developmental acceleration. Also, since POMP is a multifaceted program, additional research will be needed to identify

those specific program components that are the most (and least) important in effecting change in students' development.

During their medical education, students must acquire not only a scientific knowledge base, but also other attributes that permit them to become caring, competent physicians, comfortable with uncertainty and practicing in a rapidly changing social and medical environment. In short, students must develop the skills, values and attitudes that comprise a professional identity. The results of this study offer encouragement that it is indeed possible to design a formal, structured educational experience that fosters the development of such a professional identity. The results of this study offer encouragement that it is indeed possible to design a formal, structured educational experience that fosters the development of such a professional identity.

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TABLE I: DIDACTIC COURSES OF POMP

Course	Description	Length of Course	Objectives: Competence	Professional Responsibility	Integrity	Decision-making in uncertainty
First Year Courses						
Medical School Experience	orient students to medical education, differences between graduate/professional and undergraduate education, meet colleagues	5 wks	x	x		
Human Values in Medicine I	explore varied and multiple roles that physicians are expected to play, examine conflicts between roles, expectations, and responsibilities	6 wks	x	x		x
Medicine in Society I	explore nature of a profession and professionals, placing student within context of profession of medicine	7 wks		x	x	

TABLE I: DIDACTIC COURSES OF POMP (Continued)

Course	Description	Length of Course	Objectives: Competence	Professional Responsibility	Integrity	Decision-making in uncertainty
First Year Courses (Continued)						
Biomedical Ethics	introduction to ethical decision-making, examine issues of autonomy, beneficence, etc. in context of roles/ responsibilities of MD	10 wks	x	x	x	x
Second Year Courses						
Human Values in Medicine II	examine philosophic and theoretical frameworks surrounding death and dying from a pragmatic perspective of how to care for a dying patient	6 wks	x	x	x	x
Medicine in Society II	examine the profession within broader context of society, including social, economic, and political forces that impact on profession	6 wks	x	x	x	x
Patient Oriented Skills	interviewing, medical history taking, physical diagnosis	25 wks	x	x	x	

TABLE II: STUDENT EVALUATION OF POMP

The Profession of Medicine Program courses and preceptor group challenged me to think about:

Item	Percentage of Students Who Agree with Statement
Changing roles of the physician (Objective #1: competence)	75%
The nature of the physician's responsibility (Objective #2: professional responsibility)	77%
The congruence/incongruence between my personal values and my actions as a future physician (Objective #3: integrity)	67%
The role of uncertainty in the practice of medicine (Objective #4: decision-making in uncertainty)	77%

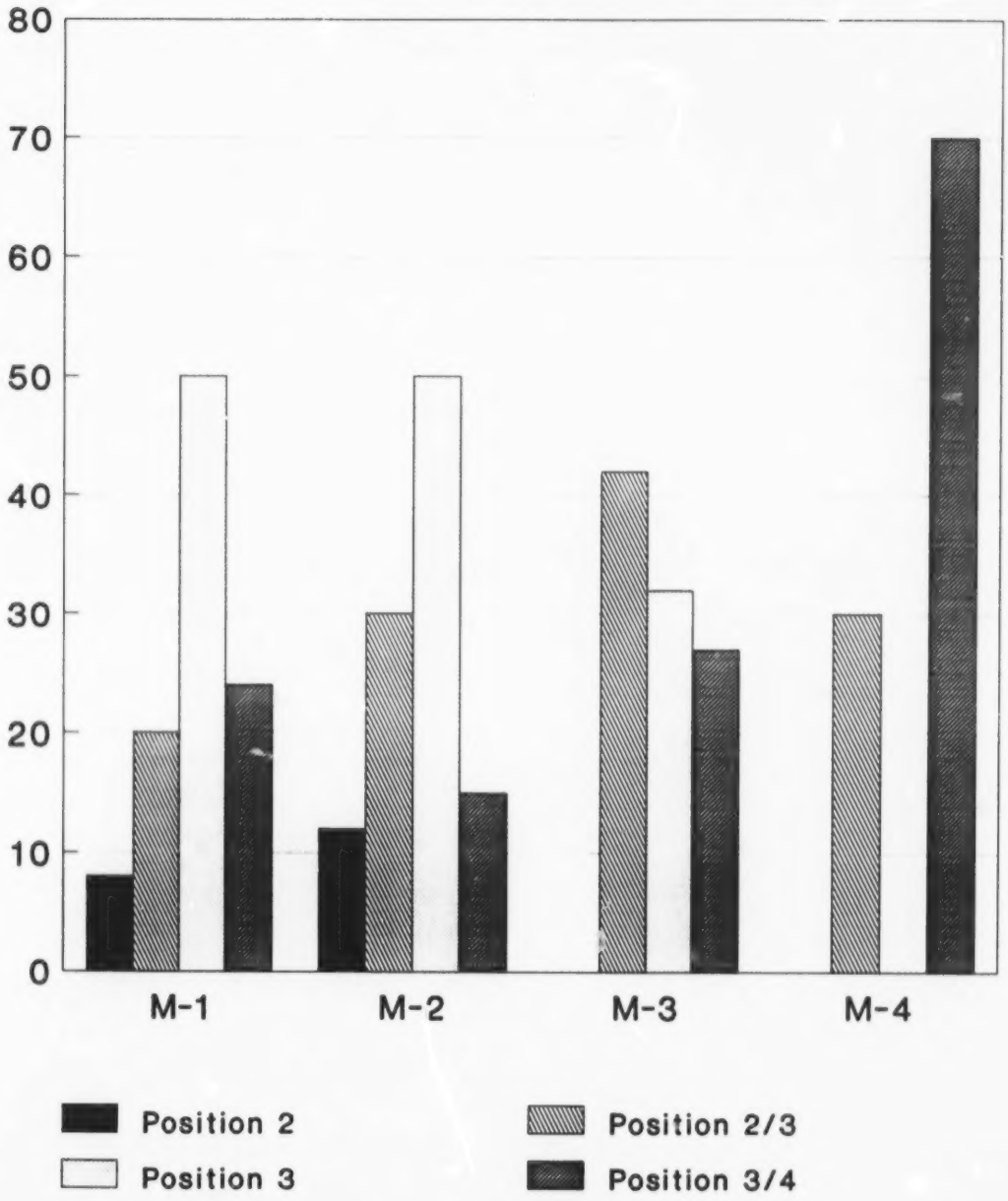
N = 351 (from Classes of 1992, 1993, and 1994)

Figure Legends

Figure 1. Distribution of scores on Measure of Intellectual Development for control groups of medical students, by year in school.

Figure 2. Distribution of scores on Measure of Intellectual Development for POMP students and controls, at completion of the program. Difference in scores is significant ($p < 0.01$).

MID Scores by Class Year



POMP • M-1, Control • M-2, M-3, M-4

Post-Experiemental Group Scores and Non-equivalent Control Group Scores